NEET 2016-I

Test Instructions

1. Total duration of this test is **180** minutes.
2. This test has 4 subjects consisting of
   180 questions in total.
3. There are **4** total sections in the test.
4. Sections Info :

   Physics
       a. **Section A** has **45** questions, compulsory questions **45**. **4** marks will be given for correct attempt and incorrect attempt **-1** .

   Chemistry
       a. **Section A** has **45** questions, compulsory questions **45**. **4** marks will be given for correct attempt and incorrect attempt **-1** .

   Botany
       a. **Section A** has **42** questions, compulsory questions **42**. **4** marks will be given for correct attempt and incorrect attempt **-1** .

   Zoology
       a. **Section A** has **48** questions, compulsory questions **48**. **4** marks will be given for correct attempt and incorrect attempt **-1** .

5. Total marks for this test is **720** marks.
6. No marks will be deducted for unattempted questions.
7. This test can be submitted only once.
8. Once the test has been submitted, you cannot edit the responses.
9. Results will be anounced post test submission.
10. The test will be auto-submitted once the timer ends.

Physics

Section A

1. If the magnitude of sum of two vectors is equal to the magnitude of difference of the two vectors, the angle between these vectors is

   1. 45^0
   2. 180^0
   3. 0^0
   4. 90^0

2. What is the minimum velocity with which a body of mass m must enter at the bottom of a vertical loop of radius R so that it can complete the loop?

   1. $\sqrt{3gR}$
   2. $\sqrt{5gR}$
   3. $\sqrt{gR}$
   4. $\sqrt{2gR}$

3. From a disc of radius R and mass M a circular hole of diameter R whose rim passes through the centre is cut. What is the moment of inertia of the remaining part of the disc about a perpendicular axis, passing through the centre?

   1. $11MR^2/32$
   2. $9MR^2/32$
   3. $15MR^2/32$
   4. $13MR^2/32$

4. A uniform circular disc of radius $50cm$ at rest is free to turn about an axis which is perpendicular to its plane and passes through its centre. It is subjected to a torque which produces a constant angular acceleration of $2.0\,\text{rads}^{-2}$. Its net acceleration in ms^{-2} at the end of $2s$ is approximately

   1. 6.0
   2. 3.0
   3. 8.0
   4. 7.0

5. Coefficient of linear expansion of brass and steel rods are α_1 and α_2 Lengths of brass and steel rods are ℓ_1 and ℓ_2 respectively. If $(\ell_2 - \ell_1)$ is maintained same at all temperatures, which one of the following relations holds good?

   1. $\alpha_1^2 \ell_2 = \alpha_2^2 \ell_1$
   2. $\alpha_1 \ell_1 = \alpha_2 \ell_2$
   3. $\alpha_1 \ell_2 = \alpha_2 \ell_1$
   4. $\alpha_1 \ell_2^2 = \alpha_2 \ell_1^2$

6. A piece of ice falls from a height h so that it melts completely. Only one-quarter of the heat produced is absorbed by the ice and all energy of ice gets converted into heat during its fall. The value of h is [latent heat of ice is $3.4 \times 10^5\,\text{J}/\text{kg}$ and $g = 10\,\text{N}/\text{kg}$]

   1. $136\ km$
   2. $68\ km$
   3. $34\ km$
   4. $544\ km$

7. A capacitor of $2\mu F$ is charged as shown in the diagram. When the switch S is turned to position 2, the percentage of its stored energy dissipated is
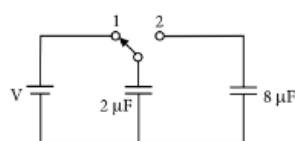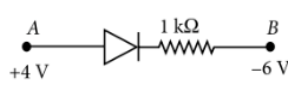

   1. 75%
   2. 80%
   3. 0%
   4. 20%

8. The charge flowing through a resistance R varies with time t as $Q = at - bt^2$ where a and b are positive constants. The total heat produced in R is

   1. $\frac{a^3 R}{2b}$
   2. $\frac{a^3 R}{b}$

3. $\frac{a^3 R}{6b}$

4. $\frac{a^3 R}{3b}$

9. A long straight wire of radius a carries a steady current I The current is uniformly distributed over its cross-section. The ratio of the magnetic fields B and B', at radial distances $\frac{a}{2}$ and $2a$ respectively, from the axis of the wire is

   1. 1

   2. 4

   3. $\frac{1}{4}$

   4. $\frac{1}{2}$

10. A small signal voltage $V(t) = V_0 \sin \omega t$ is applied across an ideal capacitor C

   1. Current $I(t)$ is in phase with voltage $V(t)$

   2. Current $I(t)$ leads voltage $V(t)$ by 180°.

   3. Current $I(t)$, lags voltage $V(t)$ by 90°.

   4. Over a full cycle the capacitor C does not consume any energy from the voltage source.

11. An inductor $20\,\text{mH}$, a capacitor 50μF and a resistor 40Ω are connected in series across a source of emf $V = 10 \sin 340t$. The power loss in A.C. circuit is

   1. $0.76\ W$

   2. $0.89\ W$

   3. 0.51 W

   4. $0.67\ W$

12. Out of the following options which one can be used to produce a propagating electromagnetic wave?

   1. A chargeless particle

   2. An accelerating charge

   3. A charge moving at constant velocity

   4. A stationary charge

13.

The intensity at the maximum in a Young's double slit experiment is I_0. Distance between two slits is $d = 5\lambda$, where λ is the wavelength of light used in the experiment. What will be the intensity in front of one of the slits on the screen placed at a distance $D = 10d$?

   1. $\frac{3}{4} I_0$

   2. $\frac{I_0}{2}$

   3. I_0

   4. $\frac{I_0}{4}$

14. In a diffraction pattern due to a single slit of width a, the first minimum is observed at an angle 30^0 when light of wavelength 5000Å is incident on the slit. The first secondary maximum is observed at an angle of:

   1. $\sin^{-1}\left(\frac{1}{2}\right)$

   2. $\sin^{-1}\left(\frac{3}{4}\right)$

   3. $\sin^{-1}\left(\frac{1}{4}\right)$

   4. $\sin^{-1}\left(\frac{2}{3}\right)$

15. Consider the junction diode as ideal. The value of current flowing through AB is

   1. 10^{-1} A

   2. 10^{-3} A

   3. 0 A

   4. 10^{-2} A

16. A npn transistor is connected in common emitter configuration in a given amplifier. A load resistance of 800Ω is connected in the collector circuit and the voltage drop across it is $0.8V$. If the current amplification factor is 0.96 and the input resistance of the circuit is 192Ω, the voltage gain and the power gain of the amplifier will respectively be

   1. 4, 4

   2. 4, 3.69

3. 4, 3.84

4. 3.69, 3.84

17. To get output 1 for the following circuit, the correct choice for the input is
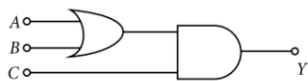
   1. $A = 1, B = 1, C = 0$

   2. $A = 1, B = 0, C = 1$

   3. $A = 0, B = 1, C = 0$

   4. $A = 1, B = 0, C = 0$

18. A particle moves so that its position vector is given by $\overrightarrow{r} = \cos \omega t \, \widehat{x} + \sin \omega t \, \hat{y}$, where ω is a constant.

Which of the following is true?

   1. Velocity is perpendicular to $\overrightarrow{r}$ and acceleration is directed towards the origin.

   2. Velocity is perpendicular to $\overrightarrow{r}$ and acceleration is directed away from the origin

   3. Velocity and acceleration both are perpendicular to $\overrightarrow{r}$

   4. Velocity and acceleration both are parallel to $\overrightarrow{r}$

19. A refrigerator works between 4^0C and $30^0 C$. It is required to remove 600 calories of heat every second in order to keep the temperature of the refrigerated space constant. The power required is (Take 1 cal = 4.2 Joules)

   1. $236.\,5$ W

   2. 2365 W

   3. $2.\,365$ W

   4. $23.\,65$ W

20. If the velocity of a particle is $v = At + Bt^2$, where $A \; and \; B$ are constants, then the distance travelled by it between $1s \; and \; 2s$ is

   1. $\frac{3}{2}A + \frac{7}{3}B$

   2. $\frac{A}{2} + \frac{B}{3}$

   3. $\frac{3}{2}A + 4B$

   4. $3\,A + 7\,B$

21. A car is negotiating a curved road of radius R. The road is banked at an angle θ. The coefficient of friction between the tyres of the car and the road is μ_s. The maximum safe velocity on this road is

   1. $\sqrt{\frac{g}{R} \frac{\mu_s + \tan \theta}{1 - \mu_s \tan \theta}}$

   2. $\sqrt{\frac{g}{R^2} \frac{\mu_s + \tan \theta}{1 - \mu_s \tan \theta}}$

   3. $\sqrt{gR^2 \frac{\mu_s + \tan \theta}{1 - \mu_s \tan \theta}}$

   4. $\sqrt{gR \frac{\mu_s + \tan \theta}{1 - \mu_s \tan \theta}}$

22. A particle of mass 10 g moves along a circle of radius $6.\,4$ cm with a constant tangential acceleration. What is the magnitude of this acceleration if the kinetic energy of the particle becomes equal to 8×10^{-4} J by the end of the second revolution after the beginning of the motion?

   1. $0.\,18 \; m/s^2$

   2. $0.\,2 \; m/s^2$

   3. $0.\,1 \; m/s^2$

   4. $0.\,15 \; m/s^2$

23. A body of mass $1kg$ begins to move under the action of a time dependent force $\overrightarrow{\mathrm{F}} = \left(2\mathrm{t} \, \hat{\mathrm{i}} + 3\mathrm{t}^2 \, \hat{\mathrm{j}}\right)$ N, where $\hat{i} \; and \; \hat{j}$ are unit vectors along $x-$axis and $y-$axis respectively. What power will be developed by the force at the time t?

   1. $\left(2t^3 + 3t^4\right)$ W

   2. $\left(2t^3 + 3t^5\right)$ W

   3. $\left(2t^2 + 3t^3\right)$ W

   4. $\left(2t^2 + 4t^4\right)$ W

24. A disk and a sphere of same radius but different masses roll off on two inclined planes of the same altitude and length. Which one of

the two objects gets to the bottom of the plane first?

   1. Both reach at the same time

   2. Depends on their masses

   3. Disk

   4. Sphere

25. At what height from the surface of earth the gravitation potential and the value of g are $-5.4 \times 10^7\ J\ kg^{-1}$ and $6.0\ m\ s^{-2}$ respectively? Take the radius of earth as $6400\ km$

   1. $1400\ km$

   2. $2000\ km$

   3. $2600\ km$

   4. $1600\ km$

26. The ratio of escape velocity at earth (v_e) to the escape velocity at a planet (v_p) whose radius and mean density are twice as that of earth is:

   1. $1:4$

   2. $1:\sqrt{2}$

   3. $1:2$

   4. $1:2\sqrt{2}$

27. Two non-mixing liquids of densities ρ and $n\rho\ (n>1)$ are put in a container. The height of each liquid is h. A solid cylinder of length L and density d is put in this container. The cylinder floats with its axis vertical and length $pL\ (\ p<1\ )$ in the denser liquid. The density d is equal to

   1. $\{2+(n-1)p\}\rho$

   2. $\{1+(n-1)p\}\rho$

   3. $\{1+(n+1)p\}\rho$

   4. $\{2+(n+1)p\}\rho$

28. A black body is at a temperature of 5760 K. The energy of radiation emitted by the body at wavelength $250\ nm$ is U_1, at wavelength 500 nm is U_2 and that at 1000 nm is U_3. Wien's constant, $b = 2.88 \times 10^6$ nmK. Which of the following is correct?

   1. $U_1 > U_2$

   2. $U_3 < U_2 > U_1$

   3. $U_1 = 0$

   4. $U_3 = 0$

29. A gas is compressed isothermally to half its initial volume. The same gas is compressed separately through an adiabatic process until its volume is again reduced to half. Then

   1. Compressing the gas isothermally or adiabatically will require the same amount of work.

   2. Which of the case (whether compression through isothermal or through adiabatic process) requires more work will depend upon the atomicity of the gas.

   3. Compressing the gas isothermally will require more work to be done.

   4. Compressing the gas through adiabatic process will require more work to be done.

30. The molecules of a given mass of a gas have r.m.s. velocity of 200 m s^{-1} at $27°$C and 1.0×10^5 N m^{-2} pressure. When the temperature and pressure of the gas are respectively, $127°$C and 0.05×10^5 N m^{-2} the r.m.s. velocity of its molecules in ms^{-1}

   1. $\frac{100\sqrt{2}}{3} ms^{-1}$

   2. $\frac{100}{3} ms^{-1}$

   3. $100\sqrt{2} ms^{-1}$

   4. $\frac{400}{\sqrt{3}} ms^{-1}$

31. A uniform rope of length L and mass m_1 hangs vertically from a rigid support. A block of mass m_2 is attached to the free end of the rope. A transverse pulse of wavelength λ_1 is produced at the lower end of the rope. The wavelength of the pulse when it reaches the top of the rope is λ_2. The ratio $\frac{\lambda_2}{\lambda_1}$ is

   1. $\sqrt{\frac{m_2}{m_1}}$

   2. $\sqrt{\frac{m_1+m_2}{m_1}}$

3. $\sqrt{\dfrac{m_1}{m_2}}$

4. $\sqrt{\dfrac{m_1+m_2}{m_2}}$

32. An air column, closed at one end and open at the other, resonates with a tuning fork when the smallest length of the column is 50cm. The next larger length of the column resonating with the same tuning fork is

    1. 150cm

    2. 200cm

    3. 66.7cm

    4. 100cm

33. A siren emitting a sound of frequency 800 Hz moves away from an observer towards a cliff at a speed of 15 m s^{-1} . Then, the frequency of sound that the observer hears in the echo reflected from the cliff is? (The Velocity of Sound in air$= 330$ m s^{-1})

    1. 838 Hz

    2. 885 Hz

    3. 765 Hz

    4. 800 Hz

34. Two identical charged spheres suspended from a common point by two massless strings of lengths l, are initially at a distance d(d<<l) apart because of their mutual repulsion. The charges begin to leak from both the spheres at a constant rate. As a result, the spheres approach each other with a velocity V. Then V varies as a function of the distance x between the spheres, as

    1. $v \propto x^{-1/2}$

    2. $v \propto x^{-1}$

    3. $y \propto x^{1/2}$

    4. $v \propto x$

35. A potentiometer wire is $100cm$ long and a constant potential difference is maintained across it. Two cells are connected in series first to support one another and then in opposite direction. The balance points are obtained at

$50cm$ and $10cm$ from the positive end of the wire in the two cases. The ratio of emf's is

    1. $3 : 4$

    2. $3 : 2$

    3. $5 : 1$

    4. $5 : 4$

36. A square loop ABCD carrying a current i, is placed near and coplanar with a long straight conductor XY carrying a current I, the net force on the loop will be
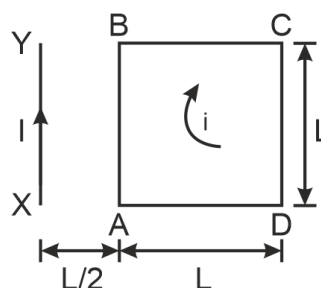
    1. $\dfrac{2\mu_0 IiL}{3\pi}$

    2. $\dfrac{\mu_0 IiL}{2\pi}$

    3. $\dfrac{2\mu_0 Ii}{3\pi}$

    4. $\dfrac{\mu_0 Ii}{2\pi}$

37. The magnetic susceptibility is negative for

    1. ferromagnetic material only

    2. paramagnetic and ferromagnetic materials

    3. diamagnetic material only

    4. paramagnetic material only

38. A long solenoid has 1000 turns. When a current of 4 A flows through it, the magnetic flux linked with each turn of the solenoid is 4×10^{-3} Wb. The self-inductance of the solenoid is

    1. 2H

    2. 1H

    3. 4H

    4. 3H

39. Match the corresponding entries of column 1 with column 2.[Where m is the magnification

produced by the mirror]

	Column-I		Column-II
(A)	m = - 2	(p)	Convex mirror
(B)	$m = -\frac{1}{2}$	(q)	Concave mirror
(C)	m = 2	(r)	Real image
(D)	$m = +\frac{1}{2}$	(s)	Virtual image

	(A)	**(B)**	**(C)**	**(D)**
(1)	p,s	q,r	q,s	q,r
(2)	r,s	q,s	q,r	p,s
(3)	q,r	q,r	q,s	p,s
(4)	p,r	p,s	p,q	r,s

1. 1

2. 2

3. 3

4. 4

40. The angle of incidence for a ray of light at a refracting surface of a prism is 45^0. The angle of prism is 60^0. If the ray suffers minimum deviation through the prism, the angle of minimum deviation and refractive index of the material of the prism respectively, are

   1. $45°; \sqrt{2}$

   2. $30°; \frac{1}{\sqrt{2}}$

   3. $45°; \frac{1}{\sqrt{2}}$

   4. $30°; \sqrt{2}$

41. An astronomical telescope has objective and eyepiece of focal lengths $40cm$ and $4cm$ respectively. To view an object $200cm$ away from the objective, the lenses must be separated by a distance

   1. 50 cm

   2. 54 cm

   3. 37.3 cm

   4. 46 cm

42. An electron of mass m and a photon have same energy E. The ratio of de-Broglie wavelengths associated with them is

1. $c(2mE)^{\frac{1}{2}}$

2. $\frac{1}{c}\left(\frac{2m}{E}\right)^{\frac{1}{2}}$

3. $\frac{1}{c}\left(\frac{E}{2m}\right)^{\frac{1}{2}}$

4. $\left(\frac{E}{2m}\right)^{\frac{1}{2}}$

   (c being velocity of light)

43. When a metallic surface is illuminated with radiation of wavelength λ the stopping potential is V. If the same surface is illuminated with radiation of wavelength 2λ the stopping potential is $\frac{V}{4}$, The threshold wavelength for the metallic surface is

   1. $\frac{5}{2}\lambda$

   2. 3λ

   3. 4λ

   4. 5λ

44. When an α -particle of mass m moving with velocity v bombards on a heavy nucleus of charge Ze, its distance of closest approach from the nucleus depends on m as

   1. $\frac{1}{m^2}$

   2. m

   3. $\frac{1}{m}$

   4. $\frac{1}{\sqrt{m}}$

45. Given the value of Rydberg constant is $10^7 m^{-1}$, the wave number of the last line of the Balmer series in hydrogen spectrum will be

   1. $0.25 \times 10^7 \text{ m}^{-1}$

   2. $2.5 \times 10^7 \text{ m}^{-1}$

   3. $0.025 \times 10^4 \text{ m}^{-1}$

   4. $0.5 \times 10^7 \text{ m}^{-1}$

   Chemistry

Section A

46. Match the compounds given in column I with the hybridisation and shape given in column II and mark the correct option.

Column I	Column II
A XeF_6	i distorted octahedral
B XeO_3	ii square planar
C $XeOF_4$	iii pyramidal
D XeF_4	iv square pyramidal

1.
A	B	C	D
(iv)	(iii)	(i)	(ii)

2.
A	B	C	D
(iv)	(i)	(ii)	(iii)

3.
A	B	C	D
(i)	(iii)	(iv)	(ii)

4.
A	B	C	D
(i)	(ii)	(iv)	(iii)

47. Equal moles of hydrogen and oxygen gases are placed in a container with a pin-hole through which both can escape. What fraction of the oxygen escapes in the time required for one-half of the hydrogen to escape?

   1. $\frac{3}{8}$

   2. $\frac{1}{2}$

   3. $\frac{1}{8}$

   4. $\frac{1}{4}$

48. For the following reactions:

   (A)
   $CH_3 CH_2 CH_2 Br + KOH \longrightarrow CH_3 CH = CH_2 + KBr + H_2O$
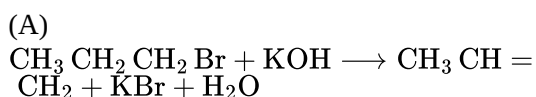
   (B)
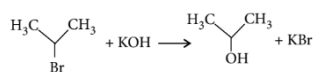
   (C)
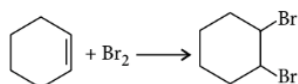
   Which of the following statement is correct?

   1. (A) is elimination, (B)and (C) are substitution reactions.

   2. (A) is substitution, (B) and (C) are addition reactions.

3. (A) and (B) are elimination reactions and (C) is addition reaction.

4. (A) is elimination, (B) is substitution and (C) is addition reaction.

49. The ionic radii of A^+ and B^- ions are 0.98×10^{-10}m and 1.81×10^{-10}m. The coordination number of each ion in AB is

   1. 8

   2. 2

   3. 6

   4. 4

50. Lithium has a b c c structure. Its density is $530 \ kg \ m^{-3}$ and its atomic mass is $6.94 \ g \ mol^{-1}$. Calculate the edge length of a unit cell of lithium metal.
   $(N_A = 6.02 \times 10^{23} \ mol^{-1})$

   1. 527 pm

   2. 264 pm

   3. 154 pm

   4. 352 pm

51. Which of the following statements about the composition of the vapour over an ideal 1: 1 molar mixture of benzene and toluene is correct? Assume that the temperature is constant at 25^0C. (Given, vapour pressure data at 25^0C, benzene =12.8kPa, toluene =3.85 kPa

   1. The vapour will contain equal amounts of benzene and toluene.

   2. Not enough information is given to make a prediction.

   3. The vapour will contain a higher percentage of benzene.

   4. The vapour will contain a higher percentage of toluene.

52. Which one of the following statements is correct when SO_2 is passed through acidified $K_2 Cr_2 O_7$ solution?

1. SO_2 is reduced .

2. Green $Cr_2(SO_4)_3$ is formed.

3. The solution turns blue.

4. The solution is decolourised .

53. The correct statement regarding the basicity of arylamines is

    1. arylamines are generally more basic than alkylamines because of aryl group

    2. arylamines are generally more basic than alkylamines, because the nitrogen atom in arylamines is sp-hybridised

    3. arylamines are generally less basic than alkylamines because the nitrogen lone-pair electrons are delocalised by interaction with the aromatic ring π-electron system

    4. arylamines are generally more basic than alkylamines because the nitrogen lone-pair electrons are not delocalised by interaction with the aromatic ring π -electron system.

54. In which of the following options the order of arrangement does not agree with the variation of property indicated against it?

    1. $I < Br < Cl < F$ (increasing electron gain enthalpy)

    2. $Li < Na < K < Rb$ (increasing metallic radius)

    3. $Al^{3+} < Mg^{2+} < Na^+ < F^-$ (increasing ionic size)

    4. $B < C < N < O$ (increasing first ionisation enthalpy)

55. MY and NY_3, two nearly insoluble salts, have the same K_{sp} values of 6.2×10^{-13} at room temperature. Which statement would be true in regard to MY and NY_3 ?

    1. The salts MY and NY_3 are more soluble in 0.5M KY than in pure water.

    2. The addition of the salt of KY to solution of MY and NY_3 will have no effect on their solubilities.

    3. The molar solubilities of MY and NY_3 in water are identical.

    4. The molar solubility of MY in water is less than that of NY_3

56. Which of the following statements about hydrogen is incorrect?

    1. Hydronium ion, H_3O^+ exists freely in solution.

    2. Dihydrogen does not act as a reducing agent.

    3. Hydrogen has three isotopes of which tritium is the least common.

    4. Hydrogen never acts as cation in ionic salts.(generally)

57. Which of the following statements is false?

    1. Ca^{2+} ions are not important in maintaining the regular beating of the heart.

    2. Mg^{2+} ions are important in the green parts of the plants.

    3. Mg^{2+} ions form a complex with ATP.

    4. Ca^{2+} ions are important in blood clotting.

58. Which is the correct statement for the given acids?

    1. Phosphinic acid is a monoprotic acid while phosphonic acid is a diprotic acid.

    2. Phosphinic acid is a diprotic acid while phosphonic acid is a monoprotic acid.

    3. Both are diprotic acids.

    4. Both are triprotic acids.

59. Which one of the following order is correct for the bond dissociation enthalpy of halogen molecules?

    1. $Br_2 > I_2 > F_2 > Cl_2$

    2. $F_2 > Cl_2 > Br_2 > I_2$

    3. $I_2 > Br_2 > Cl_2 > F_2$

    4. $Cl_2 > Br_2 > F_2 > I_2$

60. Which of the following biphenyls is optically active?
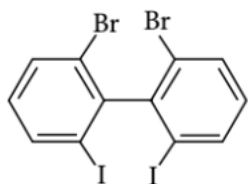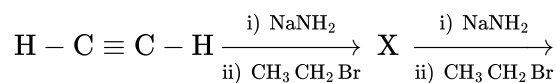
    1.
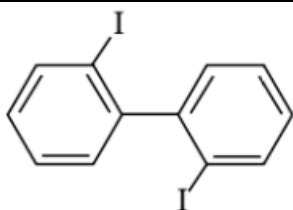
2.
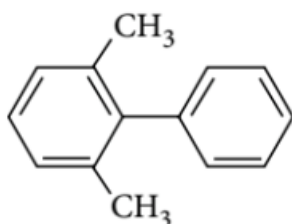
3.
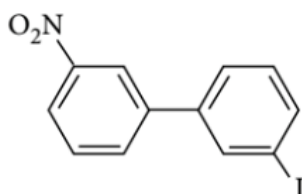
4.

61. The correct statement regarding the comparison of staggered and eclipsed conformations of ethane, is

1. the eclipsed conformation of ethane is more stable than staggered conformation even though the eclipsed conformation has torsional strain

2. the staggered conformation of ethane is more stable than eclipsed conformation, because staggered conformation has no torsional strain

3. the staggered conformation of ethane is less stable than eclipsed conformation, because staggered conformation has torsional strain

4. the eclipsed conformation of ethane is more stable than staggered conformation, because eclipsed conformation has no torsional strain.

62. In the reaction,

$$H - C \equiv C - H \xrightarrow[\text{ii) } CH_3\,CH_2\,Br]{\text{i) } NaNH_2} X \xrightarrow[\text{ii) } CH_3\,CH_2\,Br]{\text{i) } NaNH_2} Y.$$

X and Y are

1. $X = 2$ -butyne , $Y = 2$ - hexyne

2. $X =$ 1 - butyne , $Y =$ 2 - hexyne

3. $X = 1$ -butyne , $Y = 3$ - hexyne

4. $X = 2$ -butyne , $Y = 3$ - hexyne

63. Consider the nitration of benzene using mixture of conc. $H_2\,SO_4$ and HNO_3. If a large amount of $KHSO_4$ is added to the mixture, the rate of nitration will be

1. Unchanged

2. Doubled

3. Faster

4. Slower

64. Which of the following reagents would distinguish cis-cyclopenta-1,2-diol from the trans $-$ isomer?

1. MnO_2

2. Aluminium isopropoxide

3. Acetone

4. Ozone

65. The correct statement regarding a carbonyl compound with a hydrogen atom on its alpha-carbon, is

1. a carbonyl compound with a hydrogen atom on its alphacarbon rapidly equilibrates with its corresponding enol and this process is known as carbonylation

2. a carbonyl compound with a hydrogen atom on its alphacarbon rapidly equilibrates with its corresponding enol and this process is known as keto-enol tautomerism

3. a carbonyl compound with a hydrogen atom on its alpha-carbon never equilibrates with its corresponding enol

4. a carbonyl compound with a hydrogen atom on its alpha-carbon rapidly equilibrates with its corresponding enol and this process is known as aldehyde-ketone equilibration.

66. The correct thermodynamic conditions for the spontaneous reaction at all temperatures is

   1. $\Delta H < 0$ and $\Delta S > 0$

   2. $\Delta H < 0$ and $\Delta S < 0$

   3. $\Delta H < 0$ and $\Delta S = 0$

   4. $\Delta H > 0$ and $\Delta S < 0$

67. The product obtained as a result of a reaction of nitrogen with CaC_2 is

   1. $CaCN_2$

   2. $CaCN_3$

   3. $Ca_2 CN$

   4. $Ca(CN)_2$

68. When copper is heated with conc.HNO_3 it produces

   1. $Cu(NO_3)_2, NO$ and NO_2

   2. $Cu(NO_3)_2, N_2O$

   3. $Cu(NO_3)_2, NO_2$

   4. $Cu(NO_3)_2, NO$

69. Among the following, the correct order of acidity is

   1. $HClO_2 < HClO < HClO_3 < HClO_4$

   2. $HClO_4 < HClO_2 < HClO < HClO_3$

   3. $HClO_3 < HClO_4 < HClO_2 < HClO$

   4. $HClO < HClO_2 < HClO_3 < HClO_4$

70.

Consider the following liquid-vapour equilibrium.

   Liquid $\rightleftharpoons$ Vapour
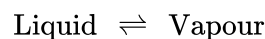
Which of the following relation is correct?

   1. $\dfrac{d\ln P}{dT^2} = \dfrac{-\Delta H_v}{T^2}$

   2. $\dfrac{d\ln P}{dT} = \dfrac{\Delta H_v}{RT^2}$

   3. $\dfrac{d\ln G}{dT^2} = \dfrac{\Delta H_v}{RT^2}$

   4. $\dfrac{d\ln P}{dT} = \dfrac{-\Delta H_v}{RT}$

71. The addition of a catalyst during a chemical reaction alters which of the following quantities?

   1. Enthalpy

   2. Activation energy

   3. Entropy

   4. Internal energy

72. Fog is a colloidal solution of

   1. Solid in gas

   2. Gas in gas

   3. Liquid in gas

   4. Gas in liquid

73. Which one of the following characteristics is associated with adsorption?

   1. ΔG and ΔH are negative but ΔS is positive.

   2. ΔG and ΔS are negative but ΔH is positive .

   3. ΔG is negative but ΔH and ΔS is positive .

   4. ΔG, ΔH and ΔS all are negative

74. The reaction
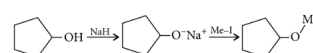
can be classified as

   1. dehydration reaction.

   2. Williamson alcohol synthesis reaction.

3. Williamson ether synthesis reaction.

4. alcohol formation reaction.

75. The product formed by the reaction of an aldehyde with a primary amine is

   1. carboxylic acid

   2. aromatic acid

   3. Schiff's base

   4. Ketone

76. Which one given below is a non-reducing sugar?

   1. Glucose

   2. sucrose

   3. Maltose

   4. Lactose

77. In a protein molecule various amino acids are linked together by

   1. peptide bond

   2. dative bond

   3. α -glycosidic bond

   4. β -glycosidic bond

78. The correct statement regarding RNA and DNA, respectively is

   1. the sugar component in RNA is arabinose and the sugar component in DNA is ribose

   2. the sugar component in RNA is 2-deoxyribose and the sugar component in DNA is arabinose

   3. the sugar component in RNA is arabinose and the sugar component in DNA is 2-deoxyribose

   4. the sugar component in RNA is ribose and the sugar component in DNA is 2 - deoxyribose.

79. Natural rubber has

   1. alternate cis- and trans-configuration

   2. random cis- and trans-configuration

   3. all cis-configuration

   4. all trans-configuration

80. The pair of electrons in the given carbanion, $CH_3 C \equiv C^-$, is present in which of the following orbitals?

   1. sp^2

   2. sp

   3. $2p$

   4. sp^3

81. The pressure of H_2 required to make the potential of H_2 electrode zero in pure water at 298 K

   1. 10^{-10} atm

   2. 10^{-4} atm

   3. 10^{-14} atm

   4. 10^{-12} atm

82. The electronic configurations of Eu (Atomic No. 63), Gd (Atomic No. 64) and Tb (Atomic No. 65) are

   1. $[Xe] 4f^6 5d^1 6s^2$, $[Xe] 4f^7 5d^1 6s^2$ and $[Xe] 4f^8 5d^1 6s^2$

   2. $[Xe] 4f^7 6s^2$, $[Xe] 4f^7 5d^1 6s^2$ and $[Xe] 4f^9 6s^2$

   3. $[Xe] 4f^7 6s^2$, $[Xe] 4f^8 6s^2$ and $[Xe] 4f^8 5d^1 6s^2$

   4. $[Xe] 4f^6 5d^1 6s^2$, $[Xe] 4f^7 5d^1 6s^2$ and $[Xe] 4f^9 6s^2$

83. Which of the following has longest $C - O$ bond length? (Free $C - O$ bond length in CO is $1.128\ A°$)

   1. $[Fe(CO)_4]^{2-}$

   2. $[Mn(CO)_6]^+$

   3. $Ni(CO)_4$

   4. $[Co(CO)_4]^-$

84.

Two electrons occupying the same orbital are distinguished by

1. azimuthal quantum number

2. spin quantum number

3. principal quantum number

4. magnetic quantum number.

85. Predict the correct order among the following ?

1. bond pair - bond pair > lone pair - bond pair > lone pair - lone pair

2. lone pair - bond pair >bond pair - bond pair > lone pair - lone pair

3. lone pair - lone pair > lone pair - bond pair > bond pair - bond pair

4.
   lone pair - lone pair > bond pair - bond pair > lone pair - bond pair

86. Consider the molecules CH_4, NH_3 and H_2O. Which of the given statements is false?

1. The $H - O - H$ bond angle in H_2O is smaller than the $H - N - H$ bond angle in NH_3

2. The $H - C - H$ bond angle in CH_4 is larger than the $H - N - H$ bond angle in NH_3

3. The $H - C - H$ bond angle in CH_4,The $H - N - H$ bond angle in NH_3 ,and the $H - O - H$ bond angle in H_2O are all greater than 90^0

4. The $H - O - H$ bond angle in H_2O is larger than the $H - C - H$ bond angle in CH_4

87. At 100^0C, the vapour pressure of a solution of $6.5g$ of a solute in 100g water is $732\,mm$. If $k_b = 0.52$, the boiling point of this solution will be

1. 102^0C

2. 103^0C

3. 101^0C

4. 100^0C

88. The rate of first-order reaction is $0.04\,mol$ $L^{-1}S^{-1}$ at 10 seconds and $0.03\,molL^{-1}S^{-1}$ at 20 seconds after initiation of the reaction. The half-life period of the reaction is

1. 44.1s

2. 54.1s

3. 24.1s

4. 34.1s

89. Match items of Column I with the items of Column II and assign the correct code :

	Column I		Column II
(A)	Cyanide process	(i)	Ultrapure Ge
(B)	Froth flotatiion process	(ii)	Dressing of ZnS
(C)	Electrolytic reduction	(iii)	Extraction of Al
(D)	Zone refining	(iv)	Extraction of Au
		(v)	Purification of Ni

	A	B	C	D
1	i	ii	iii	iv
2	iii	iv	v	i
3	iv	ii	iii	i
4	ii	iii	i	v

1. 1

2. 2

3. 3

4. 4

90. Which of the following is an analgesic?

1. Streptomycin

2. Chloromycetin

3. Novalgin

4. Penicillin

Botany

Section A

91. Which of the following statements is not correct?

    1. Pollen germination and pollen tube growth are regulated by chemical components of pollen interacting with those of the pistil.

    2. Some reptiles have also been reported as pollinators in some plant species.

    3. Pollen grains of many species can germinate on the stigma of a flower, but only one pollen tube of the same species grows into the style.

    4. Insects that consume pollen or nectar without bringing about pollination are called pollen/ nectar robbers.

92. Which one of the following statements is not true?

    1. Pollen grains of many species cause severe allergies.

    2. Stored pollen in liquid nitrogen can be used in the crop breeding programmes.

    3. Tapetum helps in the dehiscence of anther.

    4. Exine of pollen grains is made up of sporopollenin

93. The primitive prokaryotes responsible for the production of biogas from the dung of ruminant animals, include the

    1. methanogens

    2. eubacteria

    3. halophiles

    4. thermoacidophiles

94. The *Avena* curvature is used for bioassay of

    1. IAA

    2. ethylene

    3. ABA

    4. GA_3

95. Specialised epidermal cells surrounding the guard cells are called

    1. bulliform cells

    2. lenticels

    3. complementary cells

    4. subsidiary cells

96. Tricarpellary, syncarpous gynoecium is found in flowers of

    1. Fabaceae

    2. Poaceae

    3. Liliaceae

    4. Solanaceae

97. Emerson's enhancement effect and red drop have been instrumental in the discovery of

    1. photophosphorylation and cyclic electron transport

    2. oxidative phosphorylation

    3. photophosphorylation and non-cyclic electron transport

    4. two photosystems operating simultaneously.

98. In a chloroplast the highest number of protons during ETS are found in

    1. intermembrane space

    2. antennae complex

    3. stroma

    4. lumen of thylakoids

99. A system of rotating crops with legume or grass pasture to improve soil structure and fertility is called

    1. strip farming

    2. shifting agriculture

    3. ley farming

    4. contour farming

100. In a test cross involving F_1 dihybrid flies, more parental type offspring were produced than the recombinant-type offspring. This indicates

   1. the two genes are linked and present on the same chromosome

   2. both of the characters are controlled by more than one gene

   3. the two genes are located on two different chromosomes

   4. chromosomes failed to separate during meiosis.

101. Nomenclature is governed by certain universal rules. Which one of the following is contrary to the rules of nomenclature?

   1. The names are written in Latin and are italicised.

   2. When written by hand, the names are to be underlined.

   3. Biological names can be written in any language.

   4. The first word of biological name represents the genus name, and the second is a specific epithet.

102. Stems modified into flat green organs performing the functions of leaves are known as

   1. phylloclades

   2. scales

   3. cladodes

   4. phyllodes

103. The standard petal of a papilionaceous corolla is also called

   1. vexillum

   2. corona

   3. carina

   4. pappus

104. Chrysophytes, Euglenoids, Dinoflagellates and Slime moulds are included in the kingdom

   1. Fungi

   2. Animalia

   3. Monera

   4. Protista

105. One of the major components of cell wall of most fungi is

   1. cellulose

   2. chitin

   3. hemicellulose

   4. peptidoglycan

106. Which of the following statements is wrong for viroids?

   1. They cause infections.

   2. Their RNA is of high molecular weight

   3. They lack a protein coat.

   4. They are smaller than viruses.

107. Which one of the following statements is wrong?

   1. Eubacteria are also called false bacteria.

   2. Phycomycetes are also called algal fungi.

   3. Cyanobacteria are also called blue-green algae

   4. Golden algae are also called desmids.

108. Water soluble pigments found in plant cell vacuoles are

   1. carotenoids

   2. anthocyanins

   3. xanthophylls

   4. chlorophylls

109. Match the terms in column I with their description in column II and choose the correct

option.

Column I		Column II
A. Dominance	(i)	Many genes govern a single character
B. Codominance	(ii)	In a heterozygous organism only one allele expresses itself
C. Pleiotropy	(iii)	In a heterozygous organism both alleles express themselves fully
D. Polygenic inheritance	(iv)	A single gene influences many characters

	A	B	C	D
1	iv	i	ii	iii
2	iv	iii	i	ii
3	ii	i	iv	iii
4	ii	iii	iv	i

1. 1

2. 2

3. 3

4. 4

110. Which of the following is not a stem modification?

    1. Tendrils of cucumber

    2. Flattened structures of *Opuntia*

    3. Pitcher of *Nepenthes*

    4. Thorns of *Citrus*

111. Which of the following would appear as the pioneer organisms on bare rocks?

    1. Mosses

    2. Green algae

    3. Lichens

    4. Liverworts

112. A complex of ribosomes attached to a single strand of RNA is known as

    1. polypeptide

    2. Okazaki fragment

    3. polysome

    4. polymer

113. Spindle fibres attach to

    1. centromere of the chromosome

    2. kinetosome of the chromosome

    3. telomere of the chromosome

    4. kinetochore of the chromosome

114. In which of the following all three are macronutrients?

    1. Molybdenum, Magnesium, Manganese

    2. Nitrogen, Potassium, Phosphorus

    3. Boron, Zinc, Manganese

    4. Iron, Copper, Molybdenum

115. Which of the following is **not** a characteristic feature during mitosis in somatic cells?

    1. Chromosome movement

    2. Synapsis

    3. Spindle fibres

    4. Disappearance of nucleolus

116. A cell at telophase stage is observed by a student in a plant brought from the field. He tells his teacher that this cell is not like other cells at telophase stage. There is no formation of cell plate and thus the cell is containing more number of chromosomes as compared to other dividing cells. This would result in

    1. somaclonal variation

    2. polyteny

    3. aneuploidy

    4. polyploidy

117. A tall true breeding garden pea plant is crossed with a dwarf true breeding garden pea plant. When the F_1 plants were selfed the resulting genotypes were in the ratio of

    1. 3 : 1 : : Tall : Dwarf

    2. 3 : 1 : : Dwarf : Tall

    3. 1 : 2 : 1 : : Tall homozygous : Tall heterozygous : Dwarf

4. 1 : 2 : 1 : : Tall heterozygous : Tall homozygous : Dwarf

118. Which of the following is wrongly matched in the given table?

	Microbe	Product	Application
1.	*Streptococcus*	Streptokinase	Removal of clot from blood vessel
2.	*Clostridium butylicum*	Lipase	Removal of oil stains
3.	*Trichoderma polysporum*	Cyclosporin A	Immuno-suppressive drug
4.	*Monascus purpureus*	Statins	Lowering of blood cholesterol

1. 1

2. 2

3. 3

4. 4

119. Water vapour comes out from the plant leaf through the stomatal opening. Through the same stomatal opening carbon dioxide diffuses into the plant during photosynthesis. Reason out the above statements using one of following options.

1. The above processes happen only during night time.

2. One process occurs during day time and the other at night.

3. Both processes can not happen simultaneously.

4. Both processes can happen together because the diffusion of water and CO_2 is different

120. In bryophytes and pteridophytes, transport of male gametes requires

1. birds

2. water

3. wind

4. insects

121. Which one of the following cell organelles is enclosed by a single membrane?

1. Lysosomes

2. Nuclei

3. Mitochondria

4. Chloroplasts

122. Which one of the following is the starter codon?

1. UAA

2. UAG

3. AUG

4. UGA

123. Mitochondria and chloroplast are

(A) semi-autonomous organelles

(B) formed by division of pre-existing organelles and they contain DNA but lack protein synthesising machinery.

Which one of the following options is correct?

1. (A) is true but (B) is false.

2. Both (A) and (B) are false.

3. Both (A) and (B) are correct.

4. (B) is true but (A) is false.

124. A plant in your garden avoids photorespiratory losses, has improved water use efficiency, shows high rates of photosynthesis at high temperatures and has improved efficiency of nitrogen utilisation. In which of the following physiological groups would you assign this plant?

1. CAM

2. Nitrogen fixer

3. C_3

4. C_4

125.

Proximal end of the filament of stamen is attached to the

1. placenta

2. thalamus or petal

3. anther

4. connective

126. The coconut water from tender coconut represents

1. free nuclear proembryo

2. free nuclear endosperm

3. endocarp

4. fleshy mesocarp.

127. Seed formation without fertilisation in flowering plants involves the process of

1. somatic hybridisation

2. apomixis

3. sporulation

4. budding

128. Select the correct statement.

1. *Sequoia* is one of the tallest tree species.

2. The leaves of gymnosperms are not well adapted to extremes of climate.

3. Gymnosperms are both homosporous and heterosporous.

4. *Salvinia*, *Ginkgo* and *Pinus* all are gymnosperms.

129. Cotyledon of maize grain is called

1. coleoptile

2. scutellum

3. plumule

4. coleorhiza

130. Microtubules are the constituents of

1. centrioles, spindle fibres and chromatin

2. centrosome, nucleosome and centrioles

3. cilia, flagella and peroxisomes

4. spindle fibres, centrioles and cilia

131. Which of the following is required as inducer (s) for the expression of Lac operon?

1. Lactose

2. Fructose

3. Glucose

4. Galactose

132. In meiosis crossing over is initiated at

1. zygotene

2. diplotene

3. pachytene

4. leptotene

Zoology

Section A

133. Following are the two statements regarding the origin of life.

(A) The earliest organisms that appeared on the earth were non-green and presumably anaerobes.

(B) The first autotrophic organisms were the chemoautotrophs that never released oxygen.

Of the above statements which one of the following options is correct?

1. Both (A) and (B) are correct.

2. Both (A) and (B) are false.

3. (A) is correct but (B) is false.

4. (B) is correct but (A) is false.

134. Which one of the following is a characteristic feature of cropland ecosystem?

1. Absence of weeds

2. Ecological succession

3. Absence of soil organisms

4. Least genetic diversity

135. Lack of relaxation between successive stimuli in sustained muscle contraction is known as

    1. tetanus

    2. tonus

    3. spasm

    4. fatigue

136. It is much easier for a small animal to run uphill than for a large animal, because

    1. small animals have a lower O_2 requirement

    2. the efficiency of muscles in large animals is less than in the small animals

    3. it is easier to carry a small body weight

    4. smaller animals have a higher metabolic rate

137. Which of the following guards the opening of hepatopancreatic duct into the duodenum?

    1. Pyloric sphincter

    2. Sphincter of Oddi

    3. Semilunar valve

    4. Ileocaecal valve

138. Which is the National Aquatic Animal of lndia?

    1. Blue whale

    2. Sea-horse

    3. Gangetic shark

    4. River dolphin

139. Which of the following is the most important cause of animals and plants being driven to extinction?

    1. Habitat loss and fragmentation

2. Co-extinctions

3. Over-exploitation

4. Alien species invasion

140. Changes in GnRH pulse frequency in females is controlled by circulating levels of

    1. progesterone only

    2. progesterone and inhibin

    3. estrogen and progesterone

    4. estrogen and inhibin

141. Identify the correct statement on 'inhibin'.

    1. Is produced by granulosa cells in ovary and inhibits the secretion of LH

    2. Is produced by nurse cells in testes and inhibits the secretion of LH

    3. Inhibits the secretion of LH, FSH and prolactin

    4. Is produced by granulosa cells in ovary and inhibits the secretion of FSH

142. When does the growth rate of a population following the logistic model equal zero? The logistic model is given as

$dN / dt = rN (1 - N / K)$

    1. when N / K equals zero

    2. when death rate is greater than birth rate

    3. when N / K is exactly one

    4. when N nears the carrying capacity of the habitat

143. Antivenom injection contains preformed antibodies while polio drops that are administered into the body contain

    1. gamma globulin

    2. attenuated pathogens

    3. activated pathogens

    4. harvested antibodies

144. In mammals, which blood vessel would normally carry largest amount of urea?

    1. Hepatic vein

    2. Hepatic portal vein

    3. Renal vein

    4. Dorsal aorta

145. Which of the following features is **not** present in *Periplaneta americana*?

    1. Exoskeleton composed of N-acetylglucosamine

    2. Metamerically segmented body

    3. Schizocoelom as body cavity

    4. Indeterminate and radial cleavage during embryonic development

146. Depletion of which gas in the atmosphere can lead to an increased incidence of skin cancers?

    1. Ammonia

    2. Methane

    3. Nitrous oxide

    4. Ozone

147. Joint Forest Management Concept was introduced in India during

    1. 1980s

    2. 1990s

    3. 1960s

    4. 1970s

148. Which of the following structures is homologous to the wing of a bird?

    1. Hindlimb of rabbit

    2. Flipper of whale

    3. Dorsal fin of a shark

    4. Wing of a moth

149. Analogous structures are a result of

    1. shared ancestry

    2. stabilising selection

    3. divergent evolution

    4. convergent evolution

150. The term ecosystem was coined by

    1. E. Haeckel

    2. E.Warming

    3. E.P. Odum

    4. A.G. Tansley

151. In context of amniocentesis, which of the following statements is **incorrect**?

    1. It can be used for detection of Down's syndrome.

    2. It can be used for detection of cleft palate.

    3. It is usually done when a woman is between 14-16 weeks pregnant.

    4. It is used for prenatal sex determination.

152. Which type of tissue correctly matches with its location?

	Tissue	Location
1	Transitional epithelium	Tip of nose
2	Cuboidal epithelium	Lining of stomach
3	Smooth muscle	Wall of intestine
4	Areolar tissue	Tendons

    1. 1

    2. 2

    3. 3

    4. 4

153. Which of the following features is **not** present in the Phylum Arthropoda?

    1. Parapodia

    2. Jointed appendages

    3. Chitinous exoskeleton

4. Metameric segmentation

154. Reduction in pH of blood will

1. decrease the affinity of hemoglobin with oxygen

2. release bicarbonate ions by the liver

3. reduce the rate of heart beat

4. reduce the blood supply to the brain

155. In the stomach, gastric acid is secreted by the

1. peptic cells

2. acidic cells

3. gastrin secreting cells

4. parietal cells

156. Which of the following approaches does **not** give the defined action of contraceptive?

1. Hormonal contraceptives - Prevent/retard entry of sperms, prevent ovulation and fertilisation

2. Vasectomy - Prevents spermatogenesis

3. Barrier methods - Prevent fertilisation

4. Intra uterine devices - Increase phagocytosis of sperms, suppress sperm motility and fertilising capacity of sperms

157. Select the **incorrect** statement.

1. LH and FSH decrease gradually during the follicular phase.

2. LH triggers secretion of androgens from the Leydig cells.

3. FSH stimulates the Sertoli cells which help in spermiogenesis.

4. LH triggers ovulation in ovary.

158. A river with an inflow of domestic sewage rich in organic waste may result in

1. an increased production of fish due to biodegradable nutrients

2. death of fish due to lack of oxygen

3. drying of the river very soon due to algal bloom

4. increased population of aquatic food web organisms.

159. In higher vertebrates, the immune system can distinguish self-cells and non-self. If this property is lost due to genetic abnormality and it attacks self-cells, then it leads to

1. autoimmune disease

2. active immunity

3. allergic response

4. graft rejection

160. Fertilisation in humans is practically feasible only if

1. the ovum and sperms are transported simultaneously to ampullary- isthmic junction of the cervix

2. the sperms are transported into cervix within 48 hrs of release of ovum in uterus

3. the sperms are transported into vagina just after the release of ovum in fallopian tube

4. the ovum and sperms are transported simultaneously to ampullary- isthmic junction of the fallopian tube

161. Which of the following most appropriately describes haemophilia?

1. Chromosomal disorder

2. Dominant gene disorder

3. Recessive gene disorder

4. X-linked recessive gene disorder

162. Which of the following is **not** required for any of the techniques of DNA fingerprinting available at present?

1. Restriction enzymes

2. DNA-DNA hybridisation

    3. Polymerase chain reaction

    4. Zinc finger analysis

163. Asthma may be attributed to

    1. inflammation of the trachea

    2. accumulation of fluid in the lungs

    3. bacterial infection of the lungs

    4. allergic reaction of the mast cells in the lungs

164. Which one of the following characteristics is **not** shared by birds and mammals?

    1. Viviparity

    2. Homeothermy

    3. Internal fertilisation

    4. Double circulation

165. Which of the following characteristic features always holds true for the corresponding group of animals?

    1. Possess a mouth with an upper and a lower jaw - Chordata

    2. 3-chambered heart with one incompletely divided ventricle -Reptilia

    3. Cartilaginous endoskeleton - Chondrichthyes

    4. Viviparous - Mammalia

166. Blood pressure in the pulmonary artery is

    1. more than that in the pulmonary vein

    2. less than that in the venae cavae

    3. same as that in the aorta

    4. more than that in the carotid

167. Photosensitive compound in human eye is made up of

    1. opsin and retinol

    2. transducin and retinene

    3. guanosine and retinal

    4. opsin and retinal

168. Which of the following pairs of hormones are **not** antagonistic (having opposite effects) to each other?

    1. Aldosterone - Atrial Natriuretic Factor

    2. Relaxin - Inhibin

    3. Parathormone - Calcitonin

    4. Insulin - Glucagon

169. Which of the following statements is **not** true for cancer cells in relation to mutations?

    1. Mutations inactivate the cell control.

    2. Mutations inhibit production of telomerase.

    3. Mutations in proto-oncogenes accelerate the cell cycle.

    4. Mutations destroy telomerase inhibitor.

170. The two polypeptides of human insulin are linked together by

    1. covalent bonds

    2. disulphide bridges

    3. hydrogen bonds

    4. phosphodiester bonds

171. Name the chronic respiratory disorder caused mainly by cigarette smoking.

    1. Respiratory acidosis

    2. Respiratory alkalosis

    3. Emphysema

    4. Asthma

172. Gause's principle of competitive exclusion states that

    1. no two species can occupy the same niche indefinitely for the same limiting resources

    2. always larger organisms exclude smaller ones through competition

3. always more abundant species will exclude the less abundant species through competition

4. competition exclude species having different food preferences.

173. Pick out the correct statements.

(A) Haemophilia is a sex-linked recessive disease.

(B) Down's syndrome is due to aneuploidy.

(C) Phenylketonuria is an autosomal recessive gene disorder.

(D) Sickle cell anaemia is an X-linked recessive gene disorder.

   1. (A), (C) and (D) are correct.

   2. (A), (B) and (C) are correct.

   3. (A) and (D) are correct.

   4. (B) and (D) are correct.

174. The amino acid tryptophan is the precursor for the synthesis of

   1. ostrogen and progesterone

   2. cortisol and cortisone

   3. melatonin and serotonin

   4. thyroxine and triiodothyronine

175. Which of the following is a restriction endonuclease?

   1. DNase I

   2. RNase

   3. Hind II

   4. Protease

176. A typical fat molecule is made up of

1. one glycerol and one fatty acid molecule

2. three glycerol and three fatty acid molecules

3. three glycerol molecules and one fatty acid molecule

4. one glycerol and three fatty acid molecules

177. Which one of the following statements is wrong?

   1. Uracil is a pyrimidine.

   2. Glycine is a sulphur containing amino acid.

   3. Sucrose is a disaccharide.

   4. Cellulose is a polysaccharide.

178. Which of the following is **not** a feature of the plasmids?

   1. Transferable

   2. Single-stranded

   3. Independent replication

   4. Circular structure

179. The *Taq* polymerase enzyme is obtained from

   1. *Bacillus subtilis*

   2. *Pseudomonas putida*

   3. *Thermus aquaticus*

   4. *Thiobacillus ferroxidans*

180. Which part of the tobacco plant is infected by *Meloidegyne incognita*?

   1. Stem

   2. Root

   3. Flower

   4. Leaf